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***In Situ* Time-resolved Reduction of CoMoO₄**

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Beamline(s): X7B

Introduction: The catalytic activity of metal oxides is often activated by reduction with hydrogen. In general the details of these processes are poorly understood. Of special interest for the reduction of CoMoO₄ is the observation of intermediate phases.

Methods and Materials: The samples were reduced by flow of a 5% H₂/95% He mixture through an in situ reaction cell that allowed for ramps of temperature or isothermal runs. The diffraction patterns were measured with a MAR345 image plate detector.

Results: Figure 1 shows the reduction under H₂ flow during a ramp to 800C and Figure 2 shows that the reduction product can be reoxidized to CoMoO₄ by flow of O₂ during a ramp to 700C. Figure 3 show details of ramp to 800C and Figure 4 shows details of an isothermal run at 300C. Different diffraction peaks show up under different temperature variation conditions.

Conclusions: We have observed the reversible reduction/oxidation of CoMoO₄. Different intermediates are observed under different temperature conditions.

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